Hirepan Palomares Chavez

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Summary

Licentiate in Nuclear Engineering with expertise in nuclear reactor simulations and specialized experience in software development for neutron transport analysis. Proficient in both high-level and low-level programming (Python, C/C++), I have successfully developed a hybrid neutron transport solver for hexagonal geometry, enhancing the computational time for core calculations by taking advantage of Monte Carlo tools applied to deterministic solutions. Driven by a passion for advancing nuclear technology, I am eager to apply my skills to contribute to innovative projects in the nuclear industry.

Technical Skills

Nuclear calculations	:	Reactor physics, Deterministic methods, Monte Carlo methods, Fuel Burnup, Pin cell, lattice, and Core-level calculations, Fast and thermal reactor neutronic analysis.
Programming languages	:	Python, Jupyter notebook, C/C++, D, JavaScript, MATLAB, Git, Advanced skills on object oriented programming, LaTeX, Domain in Unix/Linux OS
Monte Carlo codes	:	Serpent, MCNP6, OpenMC
Data Analysis	:	Scipy, Pandas, Bayesian regression, Gradient descent, Machine learning, Neural Networks, PyTorch, TensorFlow
Soft skills	:	Problem-solving, Time management, Critical thinking, Team-work, Leadership, Presentation Skills, Scientific writing, Collaboration, Adaptability, Emotional intelligence

Experience

PhD student November 2020 – October 2024
Chalmers University Of Technology *Göteborg, Sweden*

- Developed a Hybrid **Neutron transport** solver for hexagonal geometry.
- Bridged **Python** and **C**, optimizing heavy calculations and memory requirements.
- Used the Interface Current Method in the **deterministic calculations** and **Serpent** for the **Monte Carlo** calculations
- Obtained agreeable results compared to reference solution for a Sodium Cooled Fast Reactor.

Early Team Member October 2022 - January 2023
SkyTrade - Airspace Trading Network *Remote*

- Developed a landing page for potential customers to pre-mint tokens linked to their real estate, contributing to early lead generation.
- Conducted market research, focusing in the US, to identify and evaluate potential launch sites for the platform.
- Engaged in investor outreach, presenting the concept to the European Space Agency Business Incubation Centre (ESA-BIC) in Ireland for funding opportunities.

Developer Intern October 2019 - December 2019
SCK●CEN *Mol, Belgium*

- Developed a **Machine Learning** module for nodal cross-section parametrization for MYRRHA-1.6 nuclear reactor core.
- Performed a control rod insertion analysis for the MYRRHA-1.6 nuclear reactor core, using the **Monte Carlo** simulation codes **Serpent** and **OpenMC** with **Python** and **MATLAB** tools
- Developed neutron reaction cross-section data bases in **HDF5**, **SQLite**, and **MySQL**

Invited Lecturer May 2019
Universidad Nacional Autónoma de Mexico - ENES *Morelia, Mexico*

- Gave a **lecture** with the title "Electric power generation with nuclear reactors" in the subject Systems Integration of the program Renewable Energies Engineering.

Summer Intern June 2016 - August 2016
National Institute of Nuclear Research *Morelia, Mexico*

- Developed a data pre-processing software with **Python** for the neutron analysis codes AZTRAN, AZKIND, and AZNHEX

Education

Licentiate of Engineering Göteborg, Sweden
Chalmers University Of Technology *November 2020 - October 2024*

- Field: Computational Nuclear Reactor Physics
- Thesis title: Development of a hybrid neutron transport solver
- Subdivision of Subatomic, High Energy and Plasma Physics - Physics Department

MSc on Physics and Mathematics Mexico City, Mexico
National Polytechnic Institute *February 2018 - August 2020*

- Nuclear Engineering Program
- Thesis title: Implementation of a fuel burnup module on the neutron transport code Gemma
- GPA: 9.6/10

BSc on Chemical Engineering Morelia, Mexico
Universidad Michoacana de San Nicolas de Hidalgo *August 2012 - June 2017*

- Field: Computational Chemical Reactors
- Thesis title: Fatty Acids Esterification in a semi intermittent reactor over SBA-15-SO_3H catalysts
- GPA: 8.4/10

Trainings

Digital Twins: New Horizons in Nuclear Reactor Design and Optimization Karlsruhe, Germany
Frédéric Joliot/Otto Hahn Summer School on Nuclear Reactors *August 23rd - September 1st, 2023*

Thermal Hydraulics and Safety Analysis of Accidental Sequences of Boiling Water Reactors Mexico City, Mexico
National Polytechnic Institute (80hrs) *April 2019 - May 2019*

Monte Carlo simulations with MCNP Mexico City, Mexico
National Institute of Nuclear Research (72hrs) *October 2018 - March 2019*

Languages

English	:	Professional Proficient
Spanish	:	Native Speaker
Swedish	:	Intermediate

Hobbies and interests

- Rock Climbing, Hiking, Snowboarding, Travelling
- Science-Fiction and Classical literature, Playing Chess, Playing Piano and electric guitar
- Astronomy enthusiast, Space Exploration

References

- **Christophe Demaziere** – Phone: +46 73 438 99 12 email: demaz@chalmers.se
- **Augusto Hernandez Solis** – Phone: +32 487 55 18 55 – email: augusto.hernandez.solis@sckcen.be
- **Samuel Vargas Escamilla** – Phone: +52 55 5252 2317 – email: samuel.vargas@inin.gob.mx